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समुद्री प्रयोजनों के लिए मनिला, नाइलॉन, पॉलीएस्टर तथा प्रॉलीप्रोपाइलीन की रस्सियाँ — समतुल्यता सम्बन्धी संदर्शिका

(पहला पुनरीक्षण)

Indian Standard

MANILA, NYLON, POLYESTER AND POLYPROPYLENE ROPES FOR MARINE PURPOSE — GUIDE ON EQUIVALENCE

(First Revision)

UDC 677·072·68 : 677·161·1 : 677·494 (083·4) : 629·12·015

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1992 **Price Group 1**

Cordage Sectional Committee, TX 09

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Cordage Sectional Committee had been approved by the Textile Division Council.

This Indian Standard which was published in 1981 was based on ISO 3305-1975 'Ropes and cordage — Equivalence between natural fibre ropes and man-made fibre ropes for use in mooring of vessels'. This need for the revision of this standard has been felt since the physical properties specified in the relevant standards on ropes as referred in this standard, have been modified on the basis of corresponding draft International Standards. Following are the major changes carried out in this revised standard:

a) Values of linear densities have been reduced by about 5 percent in case of 3-strand polyamide and polyester ropes; and

b) Values of minimum breaking strength for polypropylene ropes have been upgraded by about 5 percent.

The following main factors have been taken into account while formulating this standard:

a) If a man-made fibre rope is used in place of a natural fibre rope of equivalent strength it would be much smaller in diameter and could, by virtue of its smaller cross-sectional area, lose a higher proportion of its strength due to the external abrasion, chafing cuts and other forms of surface damage which occur during use.

b) The use of deck equipment not specifically designed for man-made fibre ropes could result in the possibility of excessive wear and breakage.

c) Internal abrasion between the strands of the rope may be caused by the characteristically high extension of man-made fibre ropes under load, and the corresponding recovery.

d) Some man-made fibre ropes are vulnerable to melting due to frictional heat.

e) Most man-made fibres lose strength while in hot conditions, and of the ropes quoted in the Indian Standard, this particularly applies to polyolefins. Much depends, however, on the relationship between the operating temperature and the melting point of the material.

f) In the case of polyamide ropes, there is some loss of strength on wetting.

g) All textile fibres lose strength on exposure to sunlight. The effect depends on the type of fibre, the cross-sectional area of the rope, the geographical location of use, the time of exposure, and the amount and type of stabilizer used.

h) In the event of rope breakage, the energy released causes high re-coil speeds which can be dangerous to personnel.

j) Due to the hysteresis effect, all ropes suffer a reduction in their energy absorption once the rope has been in use.

Indian Standard

MANILA, NYLON, POLYESTER AND POLYPROPYLENE ROPES FOR MARINE PURPOSE — GUIDE ON EQUIVALENCE

(First Revision)

1 SCOPE

This standard prescribes requirements of polyamide (nylon), polyester and polypropylene ropes equivalent to different manila ropes for use in mooring of ships.

2 REFERENCES

The Indian Standards listed at Annex A are necessary adjuncts to this standard.

3 EQUIVALENCE

3.1 The polyamide, polyester and polypropylene ropes recommended as equivalent to 3-strand manila ropes conforming to Grade 1 of IS1 084 : 1983 for mooring of ships are specified in Tables 1 and 2.

3.1.1 For ready reference, the linear densities and breaking strengths for different ropes are reproduced from the related standards in Table 3.

Table 1 Physical Properties of Man-Made Fibres

(*Clause* 3.1)

Physical Property	Polyamide (Nylon) Multifilament	Polyester Multifilament	Polyethylene Monofilament	Multifilament	Polypropylene	
					Monofilament	Fibrillated Film
Texture	Soft and silky	Soft and silky	Wiry like bristle	Soft and silky	Wiry like bristle	Harsh like straw
Finish	Bright lustre	Bright lustre	Surface smooth	Bright lustre	Surface smooth	Surface smooth
Cross-sectional shape	Circular	Circular	Circular	Circular	Circular	Tape
Specific gravity	1·14	1·38	0·95	0·91	0·91	0·91
Melting point, °C	250	260	135	165	165	165
Moisture regain, percent	4·0	0·4	Less than 0·01	0·1	0·1	0·1
Tenacity, g/denier	Over 8·8	Over 6·0	Over 5·5	Over 8·0	Over 5·0	Over 4·5

Table 2 Equivalence Between Manila and Man-Made Fibre Ropes

(*Clause* 3.1)

Manila Rope (3-Strand Hawser Laid) Conforming to Grade 1 of IS 1084 : 1983 Dia, mm (or Reference Number)	Polyamide Rope (3-Strand Hawser Laid) Conforming to IS 4572 : 1992 Dia, mm (or Reference Number)	Polyester Rope (3-Strand Hawser Laid) Conforming to IS 11066 : 1984 Dia, mm (or Reference Number)	Polypropylene Rope (3-Strand Hawser Laid or 8-Strand Plaited) Conforming to IS 5175 : 1992 Dia, mm (or Reference Number)
48	44	44	48
56	48	48	52
64	52	52	58
72	60	60	64
80	64	64	72
88	72	72	80
96	80	80	88
—	88	88	96

Table 3 Linear Densities and Breaking Strength of Rope

(*Clause* 3.1.1)

Manila Rope (3-Strand Hawser Laid) (In Accordance with Grade 1 of IS 1084 : 1983)		**Polyamide Rope (3-Strand Hawser Laid) (In Accordance with IS 4572 : 1992)**		**Polyester Rope (3-Strand Hawser Laid) (In Accordance with IS 11066 : 1984)**		**Polypropylene Rope (3-Strand Hawser Laid) or 8-Strand Plaited) (In Accordance with IS 5175 : 1992)**	
Linear Density ktex (g/m) ±5 percent	Minimum Breaking Strength kN	Linear Density ktex (g/m) ±5 percent	Minimum Breaking Strength kN	Linear Density ktex (g/m) ±5 percent	Minimum Breaking Strength kN	Linear Density ktex (g/m) ±5 percent	Minimum Breaking Strength kN
1 340	140	1 200	351	1 468	279	880	241·5
1 580	165	1 420	412	1 750	329	1 040	280·4
1 870	192	1 660	479	2 050	384	1 220	324·5
2 150	220	1 930	549	2 380	439	1 420	371·0
2 480	249	2 210	626	2 730	489	1 630	424·2
2 880	288	2 520	706	3 110	566	1 850	480·0
3 620	351	3 190	882	3 930	707	2 340	602·7
4 400	427	3 940	1 078	4 850	867	2 900	741·3
5 350	505	4 770	1 280	5 870	1 040	3 510	889·5
6 400	588	5 680	1 510	6 990	1 230	4 170	1 050·0

NOTE — 1 kN = 0·102 t.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
1084 : 1983	Specification for manila ropes (*third revision*)
4572 : 1992	Ropes, polyamide, multifilament (hawser-laid and plaited) — Specification (*third revision*)
6175 : 1992	Ropes, polypropylene (3-strand hawser-laid and 8-strand plaited) — Specification (*second revision*)
11066 : 1984	Specification for polyester multifilament ropes (hawser-laid)

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